Oocket 60: 008063 USA MTCG/PINTGR

PATENT/OFFICIAL

ALIS 1 1 2004 SIN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Deenesh PADHI et al.

Serial No. 10/812,480

Group Art Unit:

Filed: March 30, 2004

Examiner:

For: SELECTIVE METAL ENCAPSULATION SCHEMES

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Honorable Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. 1.56, 1.97 and 1.98, the attention of the Patent and Trademark Office is hereby directed to the documents listed on the attached form PTO-1449. It is respectfully requested that the documents be expressly considered during the prosecution of this application, and that the documents be made of record therein and appear among the "References Cited" on any patent to issue therefrom. Copies of any cited U.S. Patents and U.S. Patent Publications are not being submitted in accordance with 37 CFR 1.98(a)(2)(i).

This Information Disclosure Statement is being filed within three months of the U.S. filing date OR before the mailing date of a first Office Action on the merits. No certification or fee is required.

In accordance with 37 C.F.R. § 1.97(g) and (h), the filing of this IDS should not be construed as a representation that a search had been made or that information cited is, or is considered to be, material to patentability as defined in 37 C.F.R.§ 1.56 (b), or that any cited document listed or attached is (or constitutes) prior art. Unless otherwise indicated, the date of

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publication indicated for an item is taken from the face of the item, and Applicant reserves the right to prove that the date of publication is in fact different.

No fee is believed to be required; however, the Commissioner is authorized to charge any deficiency in any fees pursuant to 37 CFR § 1.17 associated with this communication and to credit any excess payment to Deposit Account No. 08-0219.

Respectfully submitted,

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INFORMATION DISCLOSUR	E
CITATION IN AN	
OIP APPLICATION	
(PTO-1449)	
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ATTY. DOCKET NO. 008063 USA MTCG/PINTGR SERIAL NO. 10/812,480

APPLICANT

Deenesh PADHI et al.

FILING DATE
March 30, 2004

GROUP

U.S. PATENT DOCUMENTS

EXAMINER'S INITIALS	PATENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE
	4,957,605	09/18/90	Hurwitt et al.			04/17/89
	5,240,552	08/31/93	Yu et al.			12/11/91
	5,369,544	11/29/94	Mastrangelo			04/05/93
	5,444,837	08/22/95	Bomans et al.			12/29/93
	5,665,214	09/09/97	Iturralde		-	05/03/95
	5,695,810	12/09/97	Dubin et al.			11/20/96
	5,824,599	10/20/98	Schacham-Diamand et al.			01/16/96
	5,825,356	10/20/98	Habib et al.			03/18/96
	5,831,851	11/03/98	Eastburn et al.			03/21/95
	5,838,951	11/17/98	Song			08/28/96
,	5,859,777	01/12/99	Yokoyama et al.	-		05/13/97
	5,871,805	02/16/99	Lemelson			04/08/96
	5,943,550	08/24/99	Fulford, Jr. et al.			03/29/90
	6,012,048	01/04/00	Gustin et al.			05/30/97
-	6,037,664	03/14/00	Zhao et al.			03/31/98
	6,059,636	05/09/00	Inaba et al.			07/09/98
	6,096,649	08/01/00	Jang			10/25/99
	6,100,195	08/08/00	Chan et al.			12/28/98
	6,114,238	09/05/00	Liao			05/20/98
	6,150,270	11/21/00	Matsuda et al.			01/07/99
	6,157,864	12/05/00	Schwenke et al.			05/08/98
	6,181,013 B1	01/30/01	Liu et al.			03/13/00
	6,212,961 B1	04/10/01	Dvir			02/11/99
	6,226,563 B1	05/01/01	Lim			09/04/98
	6,228,280 B1	05/08/01	Li et al.			05/06/98
	6,237,050 B1	05/22/01	Kim et al.			09/04/98
-	2001/0006873 A1	07/05/01	Moore			02/13/01
	6,259,160 B1	07/10/01	Lopatin et al.			04/21/99
	6,281,127 B1	08/28/01	Shue			04/15/99

SHEET 2 OF 4

SERIAL NO. INFORMATION DISCLOSURE ATTY. DOCKET NO. 008063 USA 10/812,480 CITATION IN AN MTCG/PINTGR APPLICATION (PTO-1449) APPLICANT Deenesh PADHI et al. FILING DATE GROUP March 30, 2004 **U.S. PATENT DOCUMENTS** EXAMINER'S FILING INITIALS PATENT NO. DATE NAME CLASS SUBCLASS DATE 6,317,643 B1 11/13/01 03/31/99 Dmochowski 6,339,727 B1 01/15/02 Ladd 12/21/98 6,355,559 B1 03/12/02 Havemann et al. 11/03/00 6,391,780 B1 05/21/02 Shih et al. 08/23/99 6,417,014 B1 07/09/02 Lam et al. 10/19/99 6,427,093 B1 07/30/02 Toprac 10/07/99 6,432,728 B1 08/13/02 Tai et al. 10/16/00 09/10/02 6,449,524 B1 Miller et al. 01/04/00 6,455,415 B1 09/24/02 Lopatin et al. 04/16/01 2002/0165636 A1 11/07/02 Hasan 04/24/02 6,484,064 B1 11/19/02 Campbell 10/05/99 6,495,452 B1 12/17/02 Shih 08/18/99 2002/0193899 A1 12/19/02 Shanmugasundram et al. 05/01/02 2003/0017256 A1 01/23/03 Shimane 06/12/02 6,515,368 B1 02/04/03 Lopatin et al. 12/07/01 6,517,414 B1 02/11/03 Tobin et al. 03/10/00 6,528,409 B1 03/04/03 Lopatin et al. 04/29/02 6,537,912 B1 03/25/03 Agarwal 08/25/00 6,580,958 B1 06/17/03 Takano 11/22/99 6,605,549 B2 08/12/03 Leu et al. 09/29/01 6,607,976 B2 08/19/03 Chen et al. 09/25/01 Tran 6,609,946 B1 08/26/03 07/14/00 6,616,513 B1 09/09/03 Osterheld 04/05/01 6,624,075 B1 09/23/03 11/05/02 Lopatin et al. 6,630,741 B1 10/07/03 Lopatin et al. 12/07/01 6,660,633 B1 12/09/03 Lopatin et al. 02/26/02 6,708,074 B1 03/16/04 Chi et al. 08/11/00 6,708,075 B2 03/16/04 Sonderman et al. 11/16/01 6,728,587 B2 04/27/04 Goldman et al. 12/27/00 **EXAMINER DATE CONSIDERED**

SHEET 3 OF 4

INFORMATION DISCLOSURE CITATION IN AN APPLICATION (PTO-1449)			ATTY. DOCKET NO. 008063 USA MTCG/PINTGR		SERIAL NO. 10/812,480			
N	(110-1	(11 2)		APPLICANT Deenesh PADI	HI et al.			
				FILING DATE March 30, 200	4	GROUP	<u> </u>	
8		FOR	EIGN PATENT	DOCUMENTS			-	
EXAMINER'S INITIALS	PATENT NO. DATE CO			DUNTRY CLASS		SUBCLASS	Translation Yes No	
	EP 0 932 195 A1	07/28/99	EP		 		X	
	EP 1 083 470 A2	03/14/01	EP				X	
	GB 2 365 215 A	02/13/02	GB		1		X	+-
		<u> </u>	L	tle, Date, Pertinent	Pages, Et		1	1
	100	CVD and PVD	- 1 8 - 88 -	l Nitrides as Diffusi			zation.	,,
	Tagami, M., A. Furuya, T. Onodera, and Y. Hayashi. 1999. "Layered Ta-nitrides (LTN) Barrier Film by Power Swing Sputtering (PSS) Technique for MOCVD-Cu Damascene Interconnects." <i>IEEE.</i> pp. 635-638. Yamagishi, H., Z. Tokei, G.P. Beyer, R. Donaton, H. Bender, T. Nogami, and K. Maex. 2000. "TEM/SEM Investigation and Electrical Evaluation of a Bottomless I-PVD TA(N) Barrier in Dual Damascene" (Abstract). <i>Advanced Metallization Conference</i> 2000. San Diego, CA.							
	Eisenbraun, Eric, Oscar van der Straten, Yu Zhu, Katharine Dovidenko, and Alain Kaloyeros. 2001. "Atomic Layer Deposition (ALD) of Tantalum-Based Materials for Zero Thickness Copper Barrier Applications" (Abstract). <i>IEEE</i> . pp. 207-209. Smith, S.R., K.E. Elers, T. Jacobs, V. Blaschke, and K. Pfeifer. 2001. "Physical and Electrical							
	Characterization of ALD Tin Used as a Copper Diffusion Barrier in 0.25 mum, Dual Damascene Backend Structures" (Abstract). Advanced Metallization Conference 2001. Montreal, Quebec.							
	Kim, Y.T. and H. Sim. 2002. "Characteristics of Pulse Plasma Enhanced Atomic Layer Deposition of Tungsten Nitride Diffusion Barrier for Copper Interconnect" (Abstract). <i>IEIC Technical Report</i> . Vol. 10: No. 178, pp. 115-118.							
	Juhanoja, and Wim	F.A. Besling.	2002. "Diffusion	Wei-Min Li, Juhana on Barrier Depositio s. Vol. 14, No. 13-	n on a Cop	per Surface by		
				H. Tsai, M.W. Lin, C Damascene Technol				
	Performance Testin Metallization." IEI	ng of Ultrathin EE. pp. 188-19	Atomic Layer D 90.	. Kaloyeros. 2002. eposition Tantalum-	Based Mat	erials for Nano	scale C	
	Wu, Z.C., Y.C. Lu, C.C. Chiang, M.C. Chen, B.T. Chen, G.J. Wang, Y.T. Chen, J.L. Huang, S.M. Jang, and M.S. Liang. 2002. "Advanced Metal Barrier Free Cu Damascene Interconnects with PECVD Silicon Carbide Barriers for 90/65-nm BEOL Technology." <i>IEEE</i> . pp. 595-598. July 25, 2003. International Search Report for PCT/US02/24858.						,, and	
	March 30, 2004. W							
	April 9, 2004. Written Opinion for PCT/US02/19116. April 22, 2004. Office Action for U.S. Serial No. 09/998,372, filed November 30, 2001.							
EXAMINER	<u> </u>	ice Action for		ATE CONSIDERE		<i>)</i> , 2001.		

SHEET 4 OF 4

CITATIC APPLIC	N DISCLOSURE ON IN AN CATION -1449)	ATTY. DOCKET NO. 008063 USA MTCG/PINTGR	SERIAL NO. 10/812,480
		APPLICANT Deenesh PADHI et al	
		FILING DATE March 30, 2004	GROUP
ОТН	ER ART (Including Author	, Title, Date, Pertinent Pages,	Etc.)
April 28, 2004. V	Written Opinion for PCT/USO	02/19117.	
April 29, 2004. V	Written Opinion for PCT/USO	02/19061.	
May 5, 2004. Of	fice Action for U.S. Serial No	o. 09/943,955, filed August 31, 2	2001.
May 5, 2004. Int	ernational Preliminary Exami	ination Report for PCT/US01/27	7406.
May 28, 2004. O	ffice Action for U.S. Serial N	To. 09/943,383, filed August 31,	2001.
June 3, 2004. Of	fice Action for U.S. Serial No	o. 09/928,474, filed August 14, 2	2001.
June 23, 2004. O	ffice Action for U.S. Serial N	To. 10/686,589, filed October 17	, 2003.
June 30, 2004. O	office Action for U.S. Serial N	To. 09/800,980, filed March 8, 2	001.
July 12, 2004. O	ffice Action for U.S. Serial N	o. 10/173,108, filed June 8, 200	2.
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EXAMINER		DATE CONSIDERED	